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TITLE: SPEAKER DIAPHRAGM

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APPL-NO: JP11114309
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INT-CL (IPC): H04 R 7/14

ABSTRACT:

PROBLEM TO BE SOLVED: To improve the sound quality of radiated sounds and to improve appearance.

SOLUTION: A speaker diaphragm 10 has a projecting part representatively shown by a ridge line 4 and a recessed part representatively shown by a ridge line 5 on an inclined part. The projecting part representatively shown by the ridge line 4 is radially formed from a central part and curved in peripheral direction toward an edge part. Thus, when moving the central part toward the base in the case of vibrating the speaker diaphragm 10 with a large amplitude, rotational power is applied to air to be gathered to the central part and pressure to the central part is reduced. Besides, the speaker diaphragm 10 forms a three-dimensional structure similar to a screw propeller, the strength of the entire speaker diaphragm 10 is reinforced and dividing vibrations are suppressed. Further, the speaker diaphragm 10 is injection molded with polypropylene as a base, at the time of production, various colors can be easily added, and a strong impression in appearance is applied together with the original structure similar to the screw propeller.

PATENT ABSTRACTS OF JAPAN

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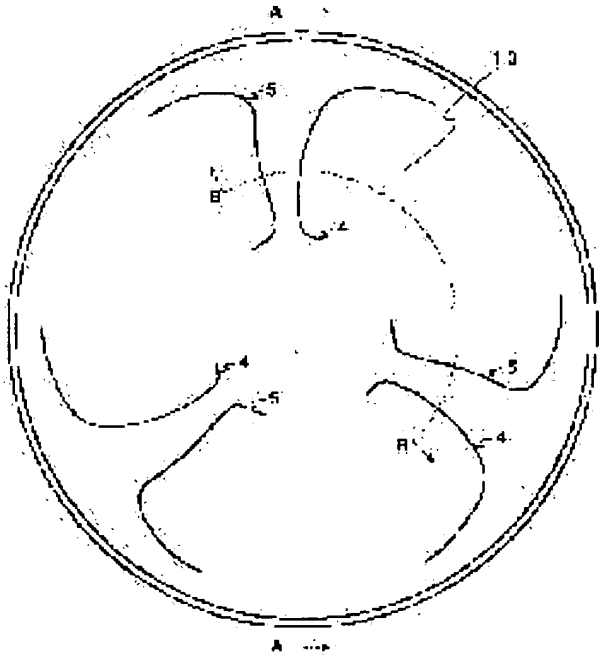
(54) SPEAKER DIAPHRAGM

(57)Abstract:
PROBLEM TO BE SOLVED: To improve the sound quality of radiated sounds and to improve appearance.
SOLUTION: A speaker diaphragm 10 has a projecting part representatively shown by a ridge line 4 and a recessed part representatively shown by a ridge line 5 on an inclined part. The projecting part representatively shown by the ridge line 4 is radially formed from a central part and curved in peripheral direction toward an edge part. Thus, when moving the central part toward the base in the case of vibrating the speaker diaphragm 10 with a large amplitude, rotational power is



applied to air to be gathered to the central part and pressure to the central part is reduced. Besides, the speaker diaphragm 10 forms a three-dimensional structure similar to a screw propeller, the strength of the entire speaker diaphragm 10 is reinforced and dividing vibrations are suppressed. Further, the speaker diaphragm 10 is injection molded with polypropylene as a base, at the time of production, various colors can be easily added, and a strong impression in appearance is applied together with the original structure similar to the screw propeller.

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* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] At least one side of a field which is equipped with the following and goes to said two or more crevices from said two or more heights is a loudspeaker diaphragm characterized by what is formed in curved surface. Two or more heights which are prepared in a radial toward the edge section in a ramp of a loudspeaker diaphragm which carried out an approximate circle drill configuration from a core, curve to a hoop direction as it goes to said edge section, and form periodic structure along a hoop direction Two or more crevices formed among said two or more heights
[Claim 2] A loudspeaker diaphragm according to claim 1 characterized by what it has for a part which one side of a field which goes to said two or more crevices from said two or more heights bent.
[Claim 3] Said two or more heights are loudspeaker diaphragms according to claim 1 or 2 characterized by what odd are prepared to a hoop direction and a screw propeller-like configuration is formed for.
[Claim 4] Near the bottom of two or more of said crevices is a loudspeaker diaphragm according to claim 1, 2, or 3 characterized by what is thickly formed as compared with other parts.
[Claim 5] A loudspeaker diaphragm characterized by forming unevenness of the shape of a screw propeller for giving force of a hoop direction to air which has an approximate circle drill configuration and goes to a core.
[Claim 6] A loudspeaker diaphragm given in claim 1 characterized by what is formed by injection molding resin which used polypropylene as a base thru/or any 1 term of 5.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] This invention relates to a loudspeaker diaphragm, and especially, the tone quality of a radiation sound is good and is related with the loudspeaker diaphragm excellent in appearance.
[0002]
[Description of the Prior Art] Conventionally, to strengthen a loudspeaker diaphragm is tried by preparing a rib etc. in a loudspeaker diaphragm. Such a rib is prepared in a radiation sound for the purpose of preventing that distortion arises by controlling generating of the partial vibration in a loudspeaker diaphragm, and carrying out flattening of the frequency characteristic.
[0003] The plan of an example of a loudspeaker diaphragm which has such a rib is shown in drawing 6 . Such a loudspeaker diaphragm has the heights 30 which serve as a rib arranged at the radial from near a center so that it may illustrate. The heights 30 prepared in such a loudspeaker diaphragm have controlled generating of partial vibration by reinforcing the reinforcement of the radiation direction of a loudspeaker diaphragm to the partial vibration which uses a hoop direction as a knot.
[0004] Moreover, the diaphragm for cone type speakers which prepared the spiral rib in JP,2-8294,U in one is indicated.
[0005]
[Problem(s) to be Solved by the Invention] According to the loudspeaker diaphragm which has a rib as shown in drawing 6 , reinforcement is not made but the above-mentioned conventional loudspeaker diaphragm has come to improve the reinforcement of a loudspeaker diaphragm efficiently to the whole in the place where the rib is not arranged. Especially the loudspeaker diaphragm that

has the conventional rib was not able to control effectively the partial vibration which uses the radiation direction as a knot.

[0006] Moreover, in case the loudspeaker diaphragm which has a rib as shown in drawing 6 vibrates with the big amplitude, the flow of the air on the surface of a diaphragm becomes a linear thing from an outside to the inside like the case where there is no rib. For this reason, when vibrating with the big amplitude, air tended to press the core of a loudspeaker diaphragm, the motion of a diaphragm fell, and the tone quality of a radiation sound was worsened.

[0007] Furthermore, the rib prepared in the conventional loudspeaker diaphragm as shown in drawing 6 is linear for appearance, and the monotonous impression was given to those who see.

[0008] Moreover, it will not result, by the time it is localization-like [a rib] and reinforces the reinforcement of the whole loudspeaker diaphragm also with the cone type speaker diaphragm currently indicated by JP,2-8294,U, and the pressure to the core of a loudspeaker diaphragm with air cannot be mitigated, either.

[0009] This invention is made in view of the above-mentioned actual condition, and aims to let the tone quality of a radiation sound offer a good loudspeaker diaphragm. Moreover, this invention aims at offering the loudspeaker diaphragm excellent in appearance.

[0010]

[Means for Solving the Problem] A loudspeaker diaphragm applied to the 1st viewpoint of this invention in order to attain the above-mentioned purpose Two or more heights which are prepared in a radial toward the edge section in a ramp of a loudspeaker diaphragm which carried out an approximate circle drill configuration from a core, curve to a hoop direction as it goes to said edge section, and form periodic structure along a hoop direction, It has two or more crevices formed among said two or more heights, and at least one side of a field which goes to said two or more crevices from said two or more heights is characterized by being formed in curved surface.

[0011] According to this invention, heights prepared in a radial in a ramp are curving to a hoop direction as they go to the edge section. For this reason, when a loudspeaker diaphragm vibrates with big amplitude and a core and a ramp move in the direction of a base, force of a hoop direction can be applied to air which is going to gather in a core, and it can be made to rotate. Pressure which joins a loudspeaker diaphragm can be mitigated by this, and tone quality of a radiation sound can be improved.

[0012] one side of a field which goes to said two or more crevices from said two

or more heights -- positive -- it is desirable to have a part the bottom. By this, reinforcement of the radiation direction of a loudspeaker diaphragm can be reinforced, partial vibration can be reduced, and tone quality of a radiation sound can be improved.

[0013] As for said two or more heights, it is desirable for odd to be prepared to a hoop direction and to form a screw propeller-like configuration. Partial vibration which uses the radiation direction as a knot can be controlled strongly by this, and tone quality of a radiation sound can be improved.

[0014] As for near the bottom of two or more of said crevices, it is desirable to be thickly formed as compared with other parts. Partial vibration produced in a crevice can be controlled strongly by this, and tone quality of a radiation sound can be improved.

[0015] Moreover, a loudspeaker diaphragm concerning the 2nd viewpoint of this invention has an approximate circle drill configuration, and is characterized by forming unevenness of the shape of a screw propeller for giving force of a hoop direction to air which goes to a core.

[0016] According to this invention, pressure to a core is mitigable by giving force of a hoop direction to air which goes to a core, and making it rotate. Therefore, voice can be emitted efficiently and tone quality can be improved.

[0017] Moreover, as for this loudspeaker diaphragm, it is desirable to be formed by injection molding resin which used polypropylene as a base. Impressive outstanding appearance can be presented to appearance by being able to create by this a loudspeaker diaphragm which is characteristic as structure easily, and adding various colors.

[0018]

[Embodiment of the Invention] Below, with reference to a drawing, the loudspeaker diaphragm concerning the gestalt of implementation of this invention is explained at details.

[0019] Drawing 1 is the plan of the loudspeaker diaphragm 10 concerning the gestalt of implementation of this invention. Drawing 2 is drawing showing at least each part at the time of classifying into a structural feature paying attention to the loudspeaker diaphragm 10 in order to give easy explanation about this loudspeaker diaphragm 10.

[0020] This loudspeaker diaphragm 10 is manufactured by injection molding the resin with which aperture is 30cm of abbreviation, and used polypropylene as the base, and as shown in drawing 2 , it consists of a core 1, a ramp 2, and the edge section 3.

[0021] A core 1 is a part used as the oscillating generation source for carrying out

joining a voice coil bobbin to a base etc., and vibrating the loudspeaker diaphragm 10.

[0022] A ramp 2 is a part for transmitting the vibration from a core 1 to surrounding air, and as shown in drawing 1 , it is equipped with two or more heights shown in a ridgeline 4 by representing, and two or more crevices shown in a groove line 5 by representing.

[0023] As shown in drawing 1 , a ramp 2 consists of three heights (represented and shown in a ridgeline 4), and a crevice (represented and shown in a groove line 5), respectively, and controls effectively quadrisection vibration which influences property deterioration of the loudspeaker diaphragm 10 greatly among the partial vibration which uses the radiation direction as a knot. Moreover, a ramp 2 can also control partial vibration other than quadrisection vibration effectively by three heights (represented and shown in a ridgeline 4), and the crevice (represented and shown in a groove line 5).

[0024] Drawing 3 is drawing showing the cross section at the time of the cutting plane line A of the radiation direction which shows the loudspeaker diaphragm 10 to drawing 1 cutting. The loudspeaker diaphragm 10 has the approximate circle drill configuration which made the parabolic object the keynote, and has the heights shown in a ridgeline 4 by representing so that it may illustrate. Here, the dotted line shown in drawing 3 shows the ridge of the heights which a ridgeline 4 draws.

[0025] As the ridgeline 4 of drawing 1 shows, the heights of this loudspeaker diaphragm 10 are curving to the hoop direction as they go to the edge section 3 while being extended from the core 1 of the loudspeaker diaphragm 10 to the radial towards the edge section 3. That is, the heights and the crevice of the loudspeaker diaphragm 10 can give turning effort to the flow of the air on the surface of a diaphragm, in case the configuration similar to a screw propeller is formed and the loudspeaker diaphragm 10 vibrates.

[0026] Drawing 4 is drawing having shown the cross section of the loudspeaker diaphragm 10 on the basis of the direction of the arrow head D which cuts the ramp 2 of the loudspeaker diaphragm 10 with the cutting plane line B along the hoop direction shown in drawing 1 , and shows it to drawing 2 . This loudspeaker diaphragm 10 is formed in [one side of a field which goes to a crevice along a hoop direction from the heights shown in a ridgeline 4] curved surface so that it may illustrate. Moreover, with the direction currently formed in curved surface, from the ridgeline 4 to the groove line 5 was formed in curved surface, and has bent the field of an opposite direction by the groove line 5. By having such a configuration, the loudspeaker diaphragm 10 is reinforcing the reinforcement of

the heights as a rib while emphasizing the configuration of an exterior screw propeller.

[0027] Moreover, as shown in drawing 4 , near the bottom 6 of the crevice of the loudspeaker diaphragm 10 is thickly fabricated compared with other parts. Thereby, the loudspeaker diaphragm 10 prevents generating of the partial vibration in a crevice, and raises the tone quality of a radiation sound.

[0028] The edge section 3 of drawing 2 is the fixing section for fixing this loudspeaker diaphragm 10 to an audio equipment, for example, is ****ed and is fixed to the cabinet of a loudspeaker system by stop-type a frame, adhesives, etc.

[0029] Below, the example at the time of applying the loudspeaker diaphragm concerning the gestalt of implementation of this invention to an audio equipment is shown.

[0030] In case an audio equipment is equipped with this loudspeaker diaphragm 10, it can equip according to the same production process as the usual loudspeaker diaphragm. That is, while ****ing the edge section 3 and fixing to a loudspeaker box with stop-type a frame, adhesives, etc., a voice coil bobbin can be joined to the base of a core 1, a magnetic circuit can be constituted, the loudspeaker diaphragm 10 can be vibrated by passing current to a magnetic circuit, and a radiation sound can be generated.

[0031] Here, when a loudspeaker diaphragm generally moves in the direction of a base in the condition that a loudspeaker diaphragm vibrates with the big amplitude, the atmospheric pressure of the core of a loudspeaker diaphragm falls. For this reason, when a loudspeaker diaphragm moves in the direction of a base, air has the property in which it gathers in the direction of a center from the edge section of a loudspeaker diaphragm.

[0032] Under the present circumstances, since the loudspeaker diaphragm 10 concerning the gestalt of implementation of this invention has the three-dimensional structure similar to a screw propeller, it can give turning effort to the air which is going to flow towards the core 1 of the loudspeaker diaphragm 10.

[0033] Drawing 5 is drawing showing the flow of the air in near the surface in case the loudspeaker diaphragm 10 vibrates with the big amplitude and the core 1 and ramp 2 of the loudspeaker diaphragm 10 move in the direction of a base. In such a case, the air for which it is going to gather to the core 1 of the loudspeaker diaphragm 10 near the surface of the loudspeaker diaphragm 10 receives the force to a hoop direction by the heights (represented and shown in a ridgeline 1) of the loudspeaker diaphragm 10 so that it may illustrate. That is, the heights of the loudspeaker diaphragm 10 can give turning effort to the air for which it is going

to gather in the direction of a center of the loudspeaker diaphragm 10. Thereby, the pressure to the core 1 of the loudspeaker diaphragm 10 with air can be mitigated, and the radiation sound of big sound volume can be emitted well.
[0034] Moreover, the ramp 3 forms heights (represented and shown in a ridgeline 4), and every three crevices (represented and shown in a groove line 5), respectively. From this, the loudspeaker diaphragm 10 can control strongly the partial vibration which uses the radiation direction as a knot, and quadrisection vibration which has big effect on property deterioration of the loudspeaker diaphragm 10 especially also in it. Thereby, flattening of the frequency characteristic of the loudspeaker diaphragm 10 is carried out, and it can improve the tone quality of a radiation sound.
[0035] Moreover, since near the bottom 6 of a crevice is thickly formed compared with other parts, it can control the partial vibration in the crevice of the loudspeaker diaphragm 10. Thereby, flattening of the frequency characteristic of the loudspeaker diaphragm 10 is carried out, and it can improve the tone quality of a radiation sound.
[0036] Furthermore, the crevice of the loudspeaker diaphragm 10 is crooked in a groove line 5, is reinforcing the reinforcement of the radiation direction of the loudspeaker diaphragm 10, and can control the partial vibration which uses a hoop direction as a knot. Thereby, flattening of the frequency characteristic of the loudspeaker diaphragm 10 is carried out, and it can improve the tone quality of a radiation sound.
[0037] Moreover, since the loudspeaker diaphragm 10 is manufactured by injection molding polypropylene, it is easy to add various colors in a manufacturing process, and can present comfortable appearance to appearance. Moreover, the structure itself differs from the conventional loudspeaker diaphragm greatly, and since the loudspeaker diaphragm 10 has the configuration similar to a screw propeller, it can give an impression strong against appearance.
[0038] As explained above, the ramp 2 forms two or more heights and crevices, and this loudspeaker diaphragm 10 is having the three-dimension-spacial configuration similar to a screw propeller. Thereby, this loudspeaker diaphragm 10 can control strongly the partial vibration which can give turning effort to the air for which it is going to gather to a core 1, and can mitigate the pressure to a core 1, and uses the radiation direction and a hoop direction as a knot. Therefore, the loudspeaker diaphragm 10 can improve the tone quality of a radiation sound.
[0039] Moreover, this loudspeaker diaphragm 10 is easy to add various colors in a manufacturing process, and further, since the feature is in the structure itself, it can present the impressive outstanding appearance to appearance.
[0040] This invention is not limited to the gestalt of the above-mentioned

implementation, but various deformation and application are possible for it. For example, although the ramp 3 explained with the gestalt of the above-mentioned implementation as what forms heights and every three crevices, respectively, the heights and the crevice of the number of arbitration which can reinforce the reinforcement of a loudspeaker diaphragm and can control partial vibration can be prepared. In this case, in order to control strongly quadrisection vibration which has big effect on property deterioration of a loudspeaker diaphragm, as for the number of heights, it is desirable for the number to be odd.

[0041] Moreover, the material of a loudspeaker diaphragm is not limited to polypropylene, but the resin material of the arbitration which can injection mold etc. can be used for it.

[0042]

[Effect of the Invention] Like the above explanation, this invention mitigates the pressure to the diaphragm surface by giving turning effort to the air which reinforces the reinforcement of the whole diaphragm and flows in near a center by considering as a three-dimension-spacial configuration similar to a screw propeller. Thereby, generating of partial vibration can be controlled effectively and the tone quality of a radiation sound can be improved. Moreover, this invention has the three-dimension-spacial configuration similar to a screw propeller, and can present the outstanding appearance from coloring by the manufacturing process being easy.

[Translation done.]

* NOTICES *

TECHNICAL FIELD

[The technical field to which invention belongs] This invention relates to a loudspeaker diaphragm, and especially, the tone quality of a radiation sound is good and is related with the loudspeaker diaphragm excellent in appearance.

[Translation done.]

* NOTICES *

PRIOR ART

[Description of the Prior Art] Conventionally, to strengthen a loudspeaker diaphragm is tried by preparing a rib etc. in a loudspeaker diaphragm. Such a rib is prepared in a radiation sound for the purpose of preventing that distortion arises by controlling generating of the partial vibration in a loudspeaker diaphragm, and carrying out flattening of the frequency characteristic.
[0003] The plan of an example of a loudspeaker diaphragm which has such a rib is shown in drawing 6 . Such a loudspeaker diaphragm has the heights 30 which serve as a rib arranged at the radial from near a center so that it may illustrate. The heights 30 prepared in such a loudspeaker diaphragm have controlled generating of partial vibration by reinforcing the reinforcement of the radiation direction of a loudspeaker diaphragm to the partial vibration which uses a hoop direction as a knot.
[0004] Moreover, the diaphragm for cone type speakers which prepared the spiral rib in JP,2-8294,U in one is indicated.

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] Like the above explanation, this invention mitigates the pressure to the diaphragm surface by giving turning effort to the air which reinforces the reinforcement of the whole diaphragm and flows in near a center by considering as a three-dimension-spacial configuration similar to a screw propeller. Thereby, generating of partial vibration can be controlled effectively and the tone quality of a radiation sound can be improved. Moreover, this invention has the three-dimension-spacial configuration similar to a screw propeller, and can present the outstanding appearance from coloring by the manufacturing process being easy.

[Translation done.]

* NOTICES *

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] According to the loudspeaker diaphragm which has a rib as shown in drawing 6 , reinforcement is not made but the above-mentioned conventional loudspeaker diaphragm has come to improve the reinforcement of a loudspeaker diaphragm efficiently to the whole in the place where the rib is not arranged. Especially the loudspeaker diaphragm that has the conventional rib was not able to control effectively the partial vibration which uses the radiation direction as a knot.

[0006] Moreover, in case the loudspeaker diaphragm which has a rib as shown in drawing 6 vibrates with the big amplitude, the flow of the air on the surface of a diaphragm becomes a linear thing from an outside to the inside like the case where there is no rib. For this reason, when vibrating with the big amplitude, air tended to press the core of a loudspeaker diaphragm, the motion of a diaphragm fell, and the tone quality of a radiation sound was worsened.

[0007] Furthermore, the rib prepared in the conventional loudspeaker diaphragm as shown in drawing 6 is linear for appearance, and the monotonous impression was given to those who see.

[0008] Moreover, it will not result, by the time it is localization-like [a rib] and reinforces the reinforcement of the whole loudspeaker diaphragm also with the cone type speaker diaphragm currently indicated by JP,2-8294,U, and the pressure to the core of a loudspeaker diaphragm with air cannot be mitigated, either.

[0009] This invention is made in view of the above-mentioned actual condition, and aims to let the tone quality of a radiation sound offer a good loudspeaker diaphragm. Moreover, this invention aims at offering the loudspeaker diaphragm excellent in appearance.

[Translation done.]

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MEANS

[Means for Solving the Problem] A loudspeaker diaphragm applied to the 1st viewpoint of this invention in order to attain the above-mentioned purpose Two or more heights which are prepared in a radial toward the edge section in a ramp of a loudspeaker diaphragm which carried out an approximate circle drill configuration from a core, curve to a hoop direction as it goes to said edge section, and form periodic structure along a hoop direction, It has two or more crevices formed among said two or more heights, and at least one side of a field which goes to said two or more crevices from said two or more heights is characterized by being formed in curved surface.
[0011] According to this invention, heights prepared in a radial in a ramp are curving to a hoop direction as they go to the edge section. For this reason, when a loudspeaker diaphragm vibrates with big amplitude and a core and a ramp move in the direction of a base, force of a hoop direction can be applied to air which is going to gather in a core, and it can be made to rotate. Pressure which joins a loudspeaker diaphragm can be mitigated by this, and tone quality of a radiation sound can be improved.
[0012] one side of a field which goes to said two or more crevices from said two or more heights -- positive -- it is desirable to have a part the bottom. By this, reinforcement of the radiation direction of a loudspeaker diaphragm can be reinforced, partial vibration can be reduced, and tone quality of a radiation sound can be improved.
[0013] As for said two or more heights, it is desirable for odd to be prepared to a hoop direction and to form a screw propeller-like configuration. Partial vibration which uses the radiation direction as a knot can be controlled strongly by this, and tone quality of a radiation sound can be improved.
[0014] As for near the bottom of two or more of said crevices, it is desirable to be thickly formed as compared with other parts. Partial vibration produced in a

crevice can be controlled strongly by this, and tone quality of a radiation sound can be improved.

[0015] Moreover, a loudspeaker diaphragm concerning the 2nd viewpoint of this invention has an approximate circle drill configuration, and is characterized by forming unevenness of the shape of a screw propeller for giving force of a hoop direction to air which goes to a core.

[0016] According to this invention, pressure to a core is mitigable by giving force of a hoop direction to air which goes to a core, and making it rotate. Therefore, voice can be emitted efficiently and tone quality can be improved.

[0017] Moreover, as for this loudspeaker diaphragm, it is desirable to be formed by injection molding resin which used polypropylene as a base. Impressive outstanding appearance can be presented to appearance by being able to create by this a loudspeaker diaphragm which is characteristic as structure easily, and adding various colors.

[0018]

[Embodiment of the Invention] Below, with reference to a drawing, the loudspeaker diaphragm concerning the gestalt of implementation of this invention is explained at details.

[0019] Drawing 1 is the plan of the loudspeaker diaphragm 10 concerning the gestalt of implementation of this invention. Drawing 2 is drawing showing at least each part at the time of classifying into a structural feature paying attention to the loudspeaker diaphragm 10 in order to give easy explanation about this loudspeaker diaphragm 10.

[0020] This loudspeaker diaphragm 10 is manufactured by injection molding the resin with which aperture is 30cm of abbreviation, and used polypropylene as the base, and as shown in drawing 2 , it consists of a core 1, a ramp 2, and the edge section 3.

[0021] A core 1 is a part used as the oscillating generation source for carrying out joining a voice coil bobbin to a base etc., and vibrating the loudspeaker diaphragm 10.

[0022] A ramp 2 is a part for transmitting the vibration from a core 1 to surrounding air, and as shown in drawing 1 , it is equipped with two or more heights shown in a ridgeline 4 by representing, and two or more crevices shown in a groove line 5 by representing.

[0023] As shown in drawing 1 , a ramp 2 consists of three heights (represented and shown in a ridgeline 4), and a crevice (represented and shown in a groove line 5), respectively, and controls effectively quadrisection vibration which influences property deterioration of the loudspeaker diaphragm 10 greatly among

the partial vibration which uses the radiation direction as a knot. Moreover, a ramp 2 can also control partial vibration other than quadrisection vibration effectively by three heights (represented and shown in a ridgeline 4), and the crevice (represented and shown in a groove line 5).

[0024] Drawing 3 is drawing showing the cross section at the time of the cutting plane line A of the radiation direction which shows the loudspeaker diaphragm 10 to drawing 1 cutting. The loudspeaker diaphragm 10 has the approximate circle drill configuration which made the parabolic object the keynote, and has the heights shown in a ridgeline 4 by representing so that it may illustrate. Here, the dotted line shown in drawing 3 shows the ridge of the heights which a ridgeline 4 draws.

[0025] As the ridgeline 4 of drawing 1 shows, the heights of this loudspeaker diaphragm 10 are curving to the hoop direction as they go to the edge section 3 while being extended from the core 1 of the loudspeaker diaphragm 10 to the radial towards the edge section 3. That is, the heights and the crevice of the loudspeaker diaphragm 10 can give turning effort to the flow of the air on the surface of a diaphragm, in case the configuration similar to a screw propeller is formed and the loudspeaker diaphragm 10 vibrates.

[0026] Drawing 4 is drawing having shown the cross section of the loudspeaker diaphragm 10 on the basis of the direction of the arrow head D which cuts the ramp 2 of the loudspeaker diaphragm 10 with the cutting plane line B along the hoop direction shown in drawing 1 , and shows it to drawing 2 . This loudspeaker diaphragm 10 is formed in [one side of a field which goes to a crevice along a hoop direction from the heights shown in a ridgeline 4] curved surface so that it may illustrate. Moreover, with the direction currently formed in curved surface, from the ridgeline 4 to the groove line 5 was formed in curved surface, and has bent the field of an opposite direction by the groove line 5. By having such a configuration, the loudspeaker diaphragm 10 is reinforcing the reinforcement of the heights as a rib while emphasizing the configuration of an exterior screw propeller.

[0027] Moreover, as shown in drawing 4 , near the bottom 6 of the crevice of the loudspeaker diaphragm 10 is thickly fabricated compared with other parts. Thereby, the loudspeaker diaphragm 10 prevents generating of the partial vibration in a crevice, and raises the tone quality of a radiation sound.

[0028] The edge section 3 of drawing 2 is the fixing section for fixing this loudspeaker diaphragm 10 to an audio equipment, for example, is ****ed and is fixed to the cabinet of a loudspeaker system by stop-type a frame, adhesives, etc.

[0029] Below, the example at the time of applying the loudspeaker diaphragm

concerning the gestalt of implementation of this invention to an audio equipment is shown.

[0030] In case an audio equipment is equipped with this loudspeaker diaphragm 10, it can equip according to the same production process as the usual loudspeaker diaphragm. That is, while ****ing the edge section 3 and fixing to a loudspeaker box with stop-type a frame, adhesives, etc., a voice coil bobbin can be joined to the base of a core 1, a magnetic circuit can be constituted, the loudspeaker diaphragm 10 can be vibrated by passing current to a magnetic circuit, and a radiation sound can be generated.

[0031] Here, when a loudspeaker diaphragm generally moves in the direction of a base in the condition that a loudspeaker diaphragm vibrates with the big amplitude, the atmospheric pressure of the core of a loudspeaker diaphragm falls. For this reason, when a loudspeaker diaphragm moves in the direction of a base, air has the property in which it gathers in the direction of a center from the edge section of a loudspeaker diaphragm.

[0032] Under the present circumstances, since the loudspeaker diaphragm 10 concerning the gestalt of implementation of this invention has the three-dimensional structure similar to a screw propeller, it can give turning effort to the air which is going to flow towards the core 1 of the loudspeaker diaphragm 10.

[0033] Drawing 5 is drawing showing the flow of the air in near the surface in case the loudspeaker diaphragm 10 vibrates with the big amplitude and the core 1 and ramp 2 of the loudspeaker diaphragm 10 move in the direction of a base. In such a case, the air for which it is going to gather to the core 1 of the loudspeaker diaphragm 10 near the surface of the loudspeaker diaphragm 10 receives the force to a hoop direction by the heights (represented and shown in a ridgeline 1) of the loudspeaker diaphragm 10 so that it may illustrate. That is, the heights of the loudspeaker diaphragm 10 can give turning effort to the air for which it is going to gather in the direction of a center of the loudspeaker diaphragm 10. Thereby, the pressure to the core 1 of the loudspeaker diaphragm 10 with air can be mitigated, and the radiation sound of big sound volume can be emitted well.

[0034] Moreover, the ramp 3 forms heights (represented and shown in a ridgeline 4), and every three crevices (represented and shown in a groove line 5), respectively. From this, the loudspeaker diaphragm 10 can control strongly the partial vibration which uses the radiation direction as a knot, and quadrisection vibration which has big effect on property deterioration of the loudspeaker diaphragm 10 especially also in it. Thereby, flattening of the frequency characteristic of the loudspeaker diaphragm 10 is carried out, and it can improve the tone quality of a radiation sound.

[0035] Moreover, since near the bottom 6 of a crevice is thickly formed compared with other parts, it can control the partial vibration in the crevice of the loudspeaker diaphragm 10. Thereby, flattening of the frequency characteristic of the loudspeaker diaphragm 10 is carried out, and it can improve the tone quality of a radiation sound.
[0036] Furthermore, the crevice of the loudspeaker diaphragm 10 is crooked in a groove line 5, is reinforcing the reinforcement of the radiation direction of the loudspeaker diaphragm 10, and can control the partial vibration which uses a hoop direction as a knot. Thereby, flattening of the frequency characteristic of the loudspeaker diaphragm 10 is carried out, and it can improve the tone quality of a radiation sound.
[0037] Moreover, since the loudspeaker diaphragm 10 is manufactured by injection molding polypropylene, it is easy to add various colors in a manufacturing process, and can present comfortable appearance to appearance. Moreover, the structure itself differs from the conventional loudspeaker diaphragm greatly, and since the loudspeaker diaphragm 10 has the configuration similar to a screw propeller, it can give an impression strong against appearance.
[0038] As explained above, the ramp 2 forms two or more heights and crevices, and this loudspeaker diaphragm 10 is having the three-dimension-spacial configuration similar to a screw propeller. Thereby, this loudspeaker diaphragm 10 can control strongly the partial vibration which can give turning effort to the air for which it is going to gather to a core 1, and can mitigate the pressure to a core 1, and uses the radiation direction and a hoop direction as a knot. Therefore, the loudspeaker diaphragm 10 can improve the tone quality of a radiation sound.
[0039] Moreover, this loudspeaker diaphragm 10 is easy to add various colors in a manufacturing process, and further, since the feature is in the structure itself, it can present the impressive outstanding appearance to appearance.
[0040] This invention is not limited to the gestalt of the above-mentioned implementation, but various deformation and application are possible for it. For example, although the ramp 3 explained with the gestalt of the above-mentioned implementation as what forms heights and every three crevices, respectively, the heights and the crevice of the number of arbitration which can reinforce the reinforcement of a loudspeaker diaphragm and can control partial vibration can be prepared. In this case, in order to control strongly quadrisection vibration which has big effect on property deterioration of a loudspeaker diaphragm, as for the number of heights, it is desirable for the number to be odd.
[0041] Moreover, the material of a loudspeaker diaphragm is not limited to polypropylene, but the resin material of the arbitration which can injection mold etc. can be used for it.

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the plan of the loudspeaker diaphragm concerning the gestalt of implementation of this invention.

[Drawing 2] It is drawing showing at least each part of the loudspeaker diaphragm concerning the gestalt of implementation of this invention.

[Drawing 3] It is the cross section of the loudspeaker diaphragm concerning the gestalt of implementation of this invention.

[Drawing 4] It is the cross section of the loudspeaker diaphragm concerning the gestalt of implementation of this invention.

[Drawing 5] It is drawing for explaining the air which flows near the surface of the loudspeaker diaphragm concerning the gestalt of implementation of this invention.

[Drawing 6] It is the plan showing an example of the conventional loudspeaker diaphragm.

[Description of Notations]

1 Core
2 Ramp
3 Edge Section
4 Ridgeline
5 Groove Line
6 Bottom
10 Loudspeaker Diaphragm
A, B Cutting plane line
30 Heights

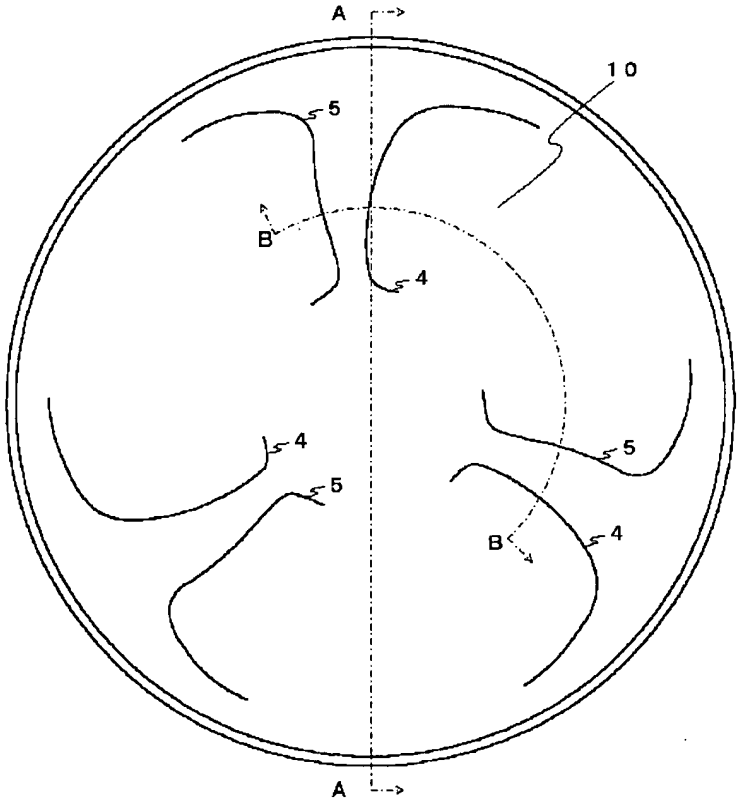
[Translation done.]

* NOTICES *

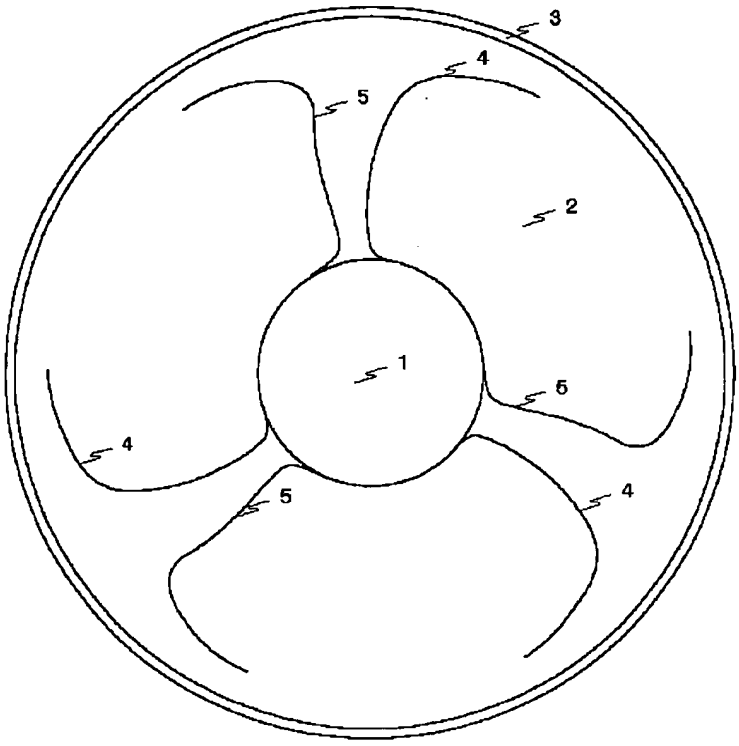
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]

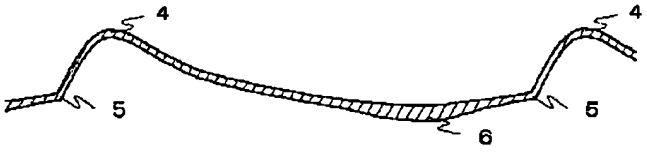


[Drawing 2]

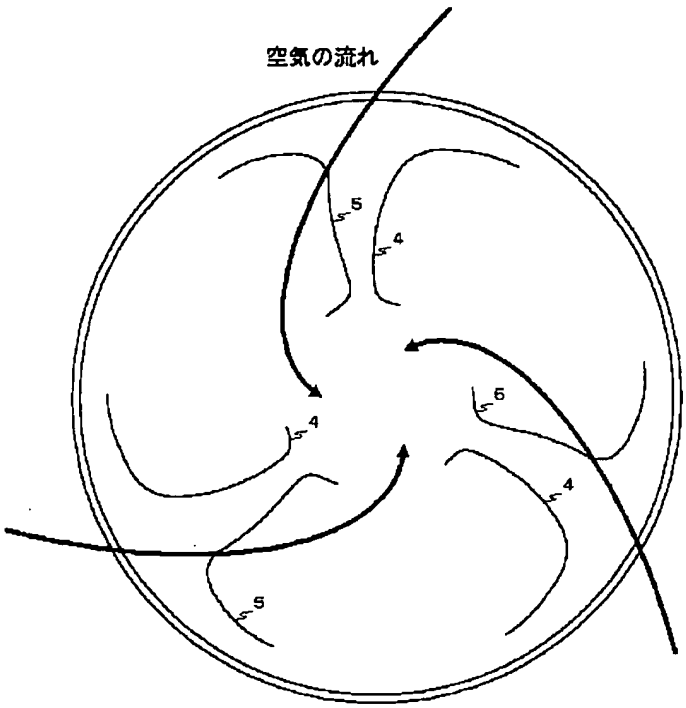


[Drawing 3]

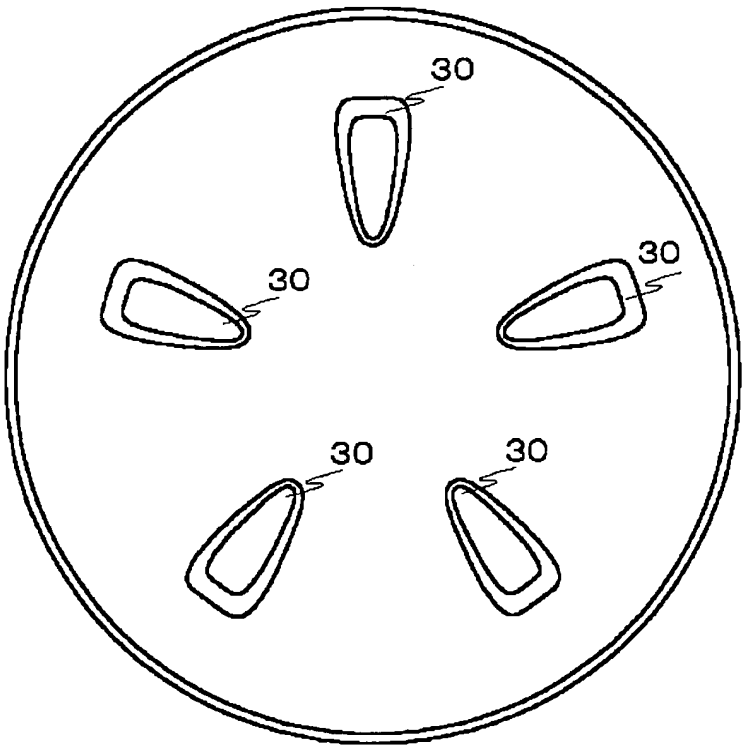
[Drawing 4]



[Drawing 5]



[Drawing 6]



[Translation done.]